

ON
THE OBJECTS AND MUTUAL RELATIONS
OF THE
MEDICAL SCIENCES ;
AN
INTRODUCTORY ADDRESS
DELIVERED AT THE
MIDDLESEX HOSPITAL SCHOOL OF MEDICINE
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It is generally considered necessary to make some apology for the publication of an Introductory Lecture. The author can offer no other ~~excuse~~ than that which is probably implied, if not expressed, on every similar occasion—the advice and request of friends. He is, however, willing to hope that a connected view of the Medical sciences and their mutual relations may not be without use to the Pupil at the commencement of his studies; nor altogether without interest to the non-professional reader, if it afford him some idea of the nature and extent of those studies by which the student of Medicine endeavours to deserve the confidence, that may be hereafter reposed in him.



INTRODUCTORY LECTURE.

GENTLEMEN,

It is, I believe, a prevalent opinion, that the custom of giving Introductory Lectures is one of questionable utility.

It is very plausibly objected, that an Introductory Lecture, if true to its object, must consist of little else than general views, which, to be clearly understood, require some knowledge of the very subject they are intended to introduce ; or perhaps of declamatory exhortations, which frequent repetition has consigned to the common-places of rhetoric, and which Genius itself can scarcely render impressive : And if these objections have been urged against lectures which are to serve as introductions to each of the several sciences comprised in a course of medical study, with how much more force, it will be

said, may they not apply to an address which is to be introductory to them all ! A custom, however, so sanctioned by time and precedent, will not be readily relinquished, and it still maintains its ground in spite of objections which a closer examination would probably show to be more specious than solid. Into such an examination it is not my intention to enter, nor shall I stop to inquire whether general views must be necessarily vague or indefinite, or whether, if they be so, they are not indispensable as the very foundation of method, without which we can scarcely hope to thread our way through the intricate mazes of a study so complicated and extensive as that of medicine. But whatever may be the strength of these objections, they are so far from acquiring additional force, when applied to a general introduction, that they rather lose the little they possess, since the higher ground on which we are placed not only enables us to take a more comprehensive view of all the subjects which are thus brought within a wider field of vision, but opens to us a new order of ideas in the relations which bind them to each other, and connect them with the common end to which they are to be rendered subservient. We are thus enabled to form that distinct conception of the object we have in view, and of the means necessary to its attainment, which, in every undertaking, is the first requisite to success. Such, then, I conceive to be

the proper object of an Introductory Lecture—to convey to the mind of the pupil a general notion of the object to be attained, a distinct, if not an adequate, conception of each of the several sciences comprehended under it, of their reciprocal relation to each other and to their common end, and of the degree of attention or study which they respectively demand.

It may appear at first sight by no means difficult to form a general idea of the object we have in view in the study of medicine—it is manifestly, you will say, the prevention and cure of disease; or, since disease is a deviation from a certain condition of the body which we call health, we may define our object to be the preservation of health. But what does this imply?—a knowledge of the conditions of health, or what is equivalent, of the conditions of life. These are, in the first place, a certain structure or arrangement of the parts of the animal body, which we call organisation; in the second, a certain determinate relation to this organised body of the external agents which surround it.

Of these two elements, as it were, of our study, the organised body on the one hand, the external agents on the other, the one appears to be sufficiently definite and tangible, but how comprehensive, how vague the other! What may not be comprehended under the influence of external agents?

The very ground on which we tread, the air we breathe, the materials which minister to our sustenance, the light which cheers us, the warmth which vivifies us, that mysterious agent, electricity, which exerts its unseen, ill understood, yet unquestionably powerful influence upon us—do not all these stand in a certain definite relation to life and health? or is there, in a word, in all nature a single substance which may not, in some conceivable relation to the organised body, exert an influence on it for good or evil? Is it not, therefore, on a certain harmonious adjustment of all these to the human body that the life and health of man is essentially dependent; and will not our ability to compass the object we have in view be exactly in proportion to our knowledge of this adjustment; in other words, to the power of controlling it, which such knowledge can alone supply? Let me endeavour to illustrate this by example.

You will, at an early period of your studies, be made acquainted with the curious properties of the atmospheric air; you will be informed that this apparently so simple substance is composed of two simpler elements differing widely in their qualities, the one highly positive, the other altogether negative. Now, there is a certain combination of these two elements, and one combination only, which is not only conducive but essential to the life and

health of man ; a certain weight or density of the air exactly adapted to the most perfect condition of health ; there are certain relations of heat and moisture, certain conditions of the soil, fitted in one case to minister to life and health, in others to become agents of destruction.

Of the properties of these agents, of their relations to the organised body, we possess some knowledge, and in proportion to this knowledge is our power of controlling them, and of adopting them as means to our end.

On the other hand, we have been taught by sad experience that there are causes in operation, of the nature of which we are totally ignorant, whereas their relation to the animal economy is too fearfully proved by their effects. We know not whence they come, or whither they depart, but we trace them sometimes in the wide wasting pestilence that follows in their track, at others in their more insidious operation ; in the character of malignancy and intractability which they may impress upon diseases which we are accustomed to look upon as completely under our control. Into the nature of these agents we possess no insight, and therefore not only do they often mock our efforts to stay their progress or abate their virulence, but they disarm us in some measure of our power of controlling the effects of those agents which are better known to us.

It is evident, therefore, how much our power of preserving health and arresting disease must depend upon our knowledge of the powers of nature, and the physician should be truly what his name implies, the natural philosopher. To him may be applied emphatically what Bacon has observed of man, "That he is but the servant and interpreter of nature, that he can act and understand no further than he has, either in operation or contemplation, observed of the method and order of nature." Such, then, gentlemen, is medical science; such must appear to be the nature of our problem, when we have the courage to conceive it in all its vastness and complexity. But to prevent misapprehension, and lest I should appear to exaggerate the difficulties of Medical Science, and to have assigned to it an extent and complexity which would place it beyond the reach of ordinary capacities, let me request your attention to the distinction between that knowledge which may be necessary to the ultimate perfection of Medicine, as a science, and that which is requisite to its more immediate application as an art—the one admitting and requiring that division of labour which is alone compatible with profound research in each of the several sciences—the other a more general acquaintance with the principles of them all, as far as they are applicable to the purposes of practice.

It is, I believe, in consequence of overlooking this distinction, that the pupil has often been discouraged by a formidable array of sciences principal and collateral, of acquirements preliminary and prospective, which were probably never yet combined in a single individual. Nevertheless, it is manifest that in endeavouring to form a distinct and adequate conception of the real nature and extent of any science whatever, we should fall far short of our object, if we were to circumscribe it within the narrow limits of our own faculties, and further still, if within those which supineness or mediocrity would attempt to fix. We must bear in mind that as in morals, so in science, there is a standard of ideal excellence to which, indeed, no one can hope to attain, but which all may endeavour to approach. With this conception of the full extent of our problem, let us see what approaches have been made towards its solution; how much the physician has yet observed of the method and order of nature, what are the objects, in so wide a field, to which his observation is more especially directed, and what the method by which that observation should be guided.

Whenever we have occasion to make anything in nature or art the subject or object of our operations, in other words, whenever we have occasion to use it, either as a means or as an end, the first indispensable requisite is to make ourselves acquainted with

its properties, *i. e.*, with its structure and uses. But in Medicine it is the human body that is the subject, and at the same time the object, of our operations—at once the means and the end. A knowledge, therefore, of the structure and uses, or, in other words, of the anatomy and physiology of the human body, is the very foundation of medical study.

When however we thus make a distinction between Anatomy and Physiology, we must not forget that we are separating in idea only, and in words, what in nature is essentially one. In Anatomy, we study the structure in repose, in Physiology, in action. The function is not one thing, and the organ another, but the function is the organ itself in action. Hence it is obvious that Anatomy and Physiology, structure and function, should be studied together, lest, in considering the function apart from the structure, the action apart from the agent, we should lose ourselves in metaphysical abstractions; and although, therefore, separate courses of lectures are sometimes given on these two subjects, in this school they are considered together; and in the remarks I am about to make I shall follow the same method, and may sometimes, perhaps, use indiscriminately and as equivalent the words Anatomy or Physiology.

In investigating the structure of the animal frame, we perceive that it is composed of a certain number

of elementary parts or tissues, which form by various dispositions and arrangements the several instruments or organs of the body. Hence it follows that each of these organs may be said to possess two sets of properties—those of its elementary tissues, and those which are the result of the peculiar arrangement and combination of those tissues, and which constitute more particularly its function or office, the word function being usually restricted to the uses of the complex organ, the word properties to those of its more general elements. Hence arises the important distinction of Anatomy and Physiology into general and special, and the relation of these to the end you have in view, the cure of disease, will be sufficiently obvious when you reflect that the properties of the healthy condition of an organ become, when disordered, the symptoms of its diseased condition.

In every case, therefore, of disease, we have the symptoms resulting from the disturbance of the specific functions of an organ, and those which have their seat in its component tissues, and which, impressing upon the disease a peculiar character, demand a corresponding modification in the treatment. In disease of the lungs, for instance, we have as the consequences of disturbed function all the painful effects of impeded respiration, and which at once point to the lung as their seat; but, in addition,

there are other symptoms which we may trace to some particular tissue, as their more immediate seat, and it is in these symptoms, more particularly, that we read the origin, course, and probable termination of the disease, and the remedy best adapted to its cure. The knowledge of general anatomy may thus be said to furnish us as it were with an analytical instrument, by which we may decompose a disease into its simpler elements, or, in other words, resolve a group of symptoms associated by their common relation to the functions of an organ, into the minor groups which are dependent on the properties of the affected tissues. I am the more anxious to impress you with the paramount importance of general Anatomy, not only because I cannot better illustrate the relation of Anatomy generally to the study of disease, but because it does not usually receive from the pupil the degree of attention it deserves, either because he is not sensible of its importance, or is impatiently hastening to what appears to him the grand object of anatomical study, a knowledge of the organs themselves, and their respective functions. He is impatient to examine the complicated apparatus by which so many marvellous effects are achieved ; to see the laboratory where the raw material is worked up ; to watch the curious processes by which it is successively converted into nutriment ; to see the waste pipes by which the

refuse matter is conveyed away, the little pumps which are incessantly at work to convey the fluid nourishment to the great reservoir ; to behold the hydraulic engine by which this nourishment is propelled to every part of the frame ; and to investigate the wonderful mechanism by which he draws in the vital air. He longs to trace the principles of optics in the dark chambers of the eye, the laws of acoustics through the labyrinthic windings of the ear, and lastly, to explore the hidden mysteries of the brain, the seat, if not the fountain, of thought ; to trace from it, in one set of nerves, the mysterious ministers of the will, and to it, in another, the faithful messengers that convey to his little world within the tidings of a world without. It is to the organs by which all this is effected, it is to special Anatomy that he looks forward for the gratification of a curiosity which has been long stirring within him ; and can we wonder if in his eager impatience he does not stop to inquire whether the tissues that compose these organs are cellular, fibrous, or medullary ; whether they secrete serum or mucus ; what are the minute variations in colour, texture, and growth, which may still consist with their healthy condition, or what may be the peculiar characters which their structure would dispose them to assume under the influence of disease. Nevertheless, when he has made some progress in his studies, and when,

confident in his knowledge of special Anatomy, he proceeds for the first time to the dead-house of the hospital, to trace after death the ravages of disease, then, perhaps, for the first time, he will discover, to his surprise and mortification, that he has Anatomy yet to learn. While, however, I insist so much on the importance of general, let me not be understood to overlook that of special, Anatomy. I rather rejoice that it must be quite unnecessary to urge the importance of a branch of the science, the knowledge of which must find its own reward, in the gratification of that curiosity which all who think must feel. Let me rather occupy your time by alluding briefly to the method by which Anatomy is to be studied, and in considering what other branches of knowledge may be subsidiary to it. With regard to the method of study it is almost trivial to remark, that although much valuable information may be acquired by diligence and attention at lectures, yet a thorough and practical acquaintance with the subject can be obtained only in the dissecting-room, and this not merely because dissection impresses the subject more deeply on the memory of the student, and enables him to acquire a greater degree of that manual dexterity so essential to operative surgery—but because it is by dissection alone that he can possibly acquire a minute and familiar acquaintance with the healthy appearance and intimate structure

of the parts on which his attention is thus necessarily rivetted. It is this alone that can furnish him with the standard of comparison by which he can distinguish the characteristics of disease ; in a word, it is thus only that general Anatomy can be learnt.

It is obvious likewise that the practice of dissection is not more useful by the knowledge it directly imparts, than by exercising that power of minute *observation* so essential to the discrimination of the various forms of disease, while, on the other hand, the pupil may cultivate and improve his powers of *reflection* by reconstructing as it were, in idea, the curious workmanship he has been taking to pieces ; by studying its several parts, not only in themselves, but in their mutual connection with each other, and in their adaptation to the end to which they are subservient. Guided by the conviction which a superficial examination must soon impress upon his mind, that as in nature generally, so in the human body most conspicuously, nothing exists without a reason ; he will endeavour to trace that reason in the structure of every part which the dissecting knife has laid open to him ; to ascertain not only the more immediate use or function of the several tissues or organs, but the way in which they are associated in the performance of some common and higher function, and finally, how these larger groups conspire together for the production of the

final effect, the organised body; that body which consists not merely of an aggregation of connected parts, but in which each part exists for the whole, while the whole exists for it, in which each part is at once the means and the end. When the student has done this, he has studied the Physiology as well as the Anatomy of the human body. He may imagine, it is true, that a competent knowledge of Physiology will be imparted to him in the lecture-room, and he is perhaps too often content to receive it thus at second hand, but he should bear in mind that the information which he thus receives, historically, as it were, of the results of the labours of others, scarcely deserves the name of knowledge, unless he has gone through the steps by which that knowledge has been attained. At all events, he will not derive from the study of Anatomy all the advantages it is capable of affording, unless he accustom himself to look upon it not merely as a source of direct knowledge, but as a mental discipline. Hence it is that many in whom the lapse of time and the distractions of practice may have obliterated much of the details of Anatomy, still experience, though perhaps unconsciously, the benefit of its study, in the powers of observation and reflection which it has exercised and improved. If it be not so, let us hear no more of mental training, of improving the faculties by exercise, or let it be denied

that Anatomy affords pre-eminently the opportunity for such exercise. As long as the latter is not denied, and the efficacy of the former not disbelieved, you cannot fail to perceive how truly it has been affirmed of Anatomy that it is the foundation of the study of Medicine.

But the study of Anatomy does not end here. When by the aid of the keenest dissecting knife the student has separated the finest tissue into its minutest fibres, and when even by the aid of the microscope, that powerful instrument of anatomical analysis, he has divided visually what he cannot dis sever mechanically, even then he has not carried his decomposition of the body to the utmost : he has not yet reached the elements out of which it is constructed ; let him, for instance, take a portion of bone, pound it into dust, take the minutest particle of that dust, subject it to the most powerful microscope, let him note the minutest particle, in the thousands of particles, which his instrument has revealed to him in that minute grain of dust, and he has not yet reached the element of which the bone is composed ; and yet, he may put himself in possession of an instrument by which he can separate these elements with as much certainty, if not with as much ease, as he can part sunder by the aid of the dissecting knife the grosser tissues of the body : and that instrument is chemistry : the science which by

teaching him the mutual action and reaction of the ultimate particles or molecules of matter, the way in which these molecules respectively separate and combine, in what determinate relations and what definite proportions, has enabled him to extort from Nature the secret of her operations, has taught him to imitate her method, like her, to unite and to separate, to build up and to destroy ; and by bringing together the particles he has thus learnt to separate, either in different proportions, or even in the same proportions in different states of aggregation, to compel them to assume almost every shape that his caprice shall dictate, to transform themselves at one time into some inert or indifferent substance, at another, into some potent remedy or deadly poison ; and while he does all this, to wield a force so energetic on the one hand that it defies his power of conception, so docile on the other, that it works silently and faithfully in obedience to his will—such is chemistry. But to return to the simple though coarse example by which I propose to illustrate its application to Anatomy, let the student immerse the bone in an acid, and the same substance that was before hard and unyielding has become so flexible that it can be turned round the finger—let him subject the same bone to the action of heat, and it will assume a condition precisely the reverse ; it will be so brittle that at the slightest touch it will crumble into dust. So

far, then, he ascertains the existence of two elements, each of which he separates from the other; he discovers that there is a certain combination of these two elements, which is essential to the healthy condition of bone, the predominance of one rendering it too brittle, of the other, too flexible. But these are, as it were, the grosser elements into which the substance can be resolved. By similar processes of chemistry he can decompose these again and again into others still more minute, until at last he reaches those which have hitherto resisted all power of analysis, and which are called the last or ultimate elements.

Although I have chosen bone as a familiar and easily understood example to illustrate the relation of Chemistry to Anatomy, yet it is manifest that by the same instrument we can decompose all the other tissues as well as fluids of the body, and thus ascertain the proportion in which their respective elements should combine, in order to constitute their healthy condition. Nor is its relation to Physiology less intimate and important. It gives us a deeper insight into the nature of many functions in which chemical agency is essentially concerned, such as respiration, secretion, nutrition, the generation of animal heat—in a word, the whole series of alternate compositions and decompositions in which life indeed has by some been defined to consist.

Be that, however, as it may, you will perceive that we possess in Chemistry an instrument of analysis more searching than the dissecting-knife, but with the aid of either of these instruments we decompose only by destroying. The more simple structures which we can display by the dissecting-knife we do not see in action, nor can we always be certain that extreme minuteness of structure has not baffled our attempts to unravel all the complexity of the highly elaborate workmanship presented to us in many of the organs of the body. But here again we are not without resource; what we ourselves can scarcely hope to effect, Nature has accomplished for us. She has herself decomposed the complicated structure by presenting it to us in other animals, first in its elementary simplicity, then rising gradually through different degrees of complication until it becomes inextricable. Take, for instance, a secreting gland, in its highest degree of perfection; how complicated, how inextricable its structure; yet if we trace it in its gradation upwards from its simplest condition, we shall discover that its primitive elements consist of a nerve, a blood-vessel, an absorbent, and a cellular tissue to connect them; and that its greatest degree of intricacy is a mere matter of arrangement or contrivance for packing the greatest quantity of secreting surface into the smallest possible space. We have first

a membrane, then a small increase of surface by little pits or depressions, then a deepening of these pits into little pouches, or canals, these again increasing in size and number, assuming a variety of forms, uniting in clusters connected by a common tube or duct, then forming a compact mass or gland, and finally, these glands combining to construct the elaborate organ that has perplexed us by its intricacy, and which we find at last to be an accumulation into a given space of an enormous extent of secreting membrane, with a corresponding concentration of secreting power. Now, these several intermediate conditions of a secreting apparatus may be traced either in the same animal in different organs, or in the same organ in different animals. What I have thus endeavoured to illustrate by the structure of the gland might be shown to apply to other organs of the body. But the example I have chosen was of an organ intricate and complicated in its structure, but not complex, and having for its effect a single and simple function—secretion. But there are organs the structure of which is more complex—the eye, for instance. We are apt, indeed to consider it as a single organ, and properly enough in relation to its final function, vision, but it is in reality a congeries of organs, each performing its peculiar function, by which it tends to the production of the final purpose of the complex instrument.

There are, in the first place, certain media, of different degrees of sphericity and density, to transmit and to refract the light, which is thus made to convey and form an image on another instrument, the retina, the more immediate seat of vision. There is a curtain to regulate the admission of light, a blackened surface to absorb the reflected light, a certain contrivance for preserving the distinctness of the image by adjusting the focus to the varying distance of the object, and many other curious arrangements, both in the internal and external apparatus of the eye, which may be considered as so many distinct instruments, with their corresponding functions. In this case, however, the exquisite adaptation of means to ends, or rather our knowledge of the laws of optics which guide that adaptation, enables us to assign to each of these several instruments its appropriate function, and to show how it contributes to the common end of the other instruments with which it is associated.

But what would be the state of our knowledge of many other organs of the human body, if we were obliged to study the uses of its several parts in man alone? The brain, for instance, how numerous, how diversified are its functions! How numerous, therefore, and how various, must be the organs requisite to their production! How are they to be distinguished. If the anatomist may flatter himself

that he can distinguish these different organs by slight differences of mechanical arrangement, slight diversities of texture imperceptible to the unpractised eye, even then he cannot detect in them their fitness to a given end. He has not, as in the case of the eye, that knowledge of the laws which nature follows in their construction, which shall enable him, from the manifest structure of these organs in conformity with such law, to discern the end or functions to which they are adapted. The only conceivable way by which he could ascertain the function of each separate part would be by insulating it from the others, and observing its separate action. But this, in many cases at least, he could not do, because by separation ^{he} he would destroy. But Nature has done it for him ; she has virtually achieved the division without impairing the integrity of the complex organ, by presenting to him in different animals the same organ in different degrees of complexity, and thus enabling him to compare the superadded function with the superadded structure. Nor does this remark apply solely to single complex organs, but likewise to associated organs, many of which are so closely linked together by reciprocal dependence especially in man and the higher animals, that it is often difficult so to analyse any complex action that is the joint result of many parts, as to assign each its respective share in its production. If my time

permitted, I could illustrate this by referring to the very interesting question of the physiology of death. I could show how much this question is perplexed by the reciprocal influence and dependence of the functions concerned, and how much, on the other hand, it is elucidated by studying the action of the same organs, as they exist in a more insulated condition in other animals.

From these considerations it must be obvious how much assistance the student of Anatomy may derive from the study of the structure and functions of the lower animals ; or in other words, from comparative Anatomy, which, to resume some of its advantages, enable us,

1. To unravel the intricacy of a complicated organ, by showing it to us in other animals in its simplest condition and primitive elements.

2. To resolve a complex organ into its component functions and structures, by presenting it to us in different degrees of complexity with the corresponding variations of function.

3. To disentangle, as it were, the intricate results of associated action, by presenting to us in a more insulated and independent condition those organs of which the functions are masked and obscured by the reciprocal influence, the innumerable actions and reactions, by which they are linked together in the complicated organisation of man.

To these manifest, and I may say indispensable, aids which comparative furnishes to human Anatomy, I may add likewise the opportunities it affords, *where the end sanctions the means*, to supply by experiment the deficiency of direct observation, it being manifest that we must be acquainted with the structure of the animals we are about to make the subjects of such experiment. But it must be borne in mind that the truly scientific physiologist prefers to interrogate Nature rather by the gentler methods of observation than by the more violent means of experiment, and that whenever he has recourse to the latter alternative, it is with that clear conception of the end he has in view, of the degree of evidence the experiment is likely to afford, and of the benefit which such evidence is calculated to produce, which can alone justify and even demand the infliction of pain. But all this requires a greater degree of knowledge, and a deeper insight into the problems of physiology, than the pupil can be expected to possess. In availing himself, therefore, as far as time and opportunity will allow, of the ample resources of comparative Anatomy, he may safely omit experiment, while, on the other hand, he will be taught by the lecturer on Botany, how he may extend his researches to the vegetable kingdom, where he will not search in vain for objects of comparison. He will find in it a source of analogies, remote, it is

true, in the more specific details of structure, but rising in importance as he elevates himself to the more general views of the laws of life and organisation, which must form an essential part of the problem he proposes to himself in the study of the organisation of man. Nor should he, in investigating the laws of life, overlook the advantages he may derive from the study of the laws of matter. I have already had occasion to observe, that with regard to the eye, for instance, the intelligent student might recognise in its very structure the functions it was destined to perform; that he might infer from the exquisite adjustment of all its parts, in strict accordance with the principles of optics, that that function is vision. But this would imply on his part a knowledge of the principles of optics. Nor is the eye the only organ constructed in manifest accordance with those laws of matter comprehended in the science of natural philosophy. "Where is there," says Dr. Arnott in the introduction to his admirable work on the Elements of Physics, "where is there, to illustrate mechanics, a system of levers and hinges and moving parts like the limbs of the animal body—where such a hydraulic apparatus as in the heart and blood-vessels—such a pneumatic apparatus as in the breathing chest—such acoustic instruments as in the ear and larynx—such an optical instrument as in the eye—

in a word, such mechanical variety and perfection as in the whole of the visible Anatomy. All these structures the medical man should of course understand—in other words, he should be acquainted with the principles of natural philosophy.

From the structure and functions of the body in health to the structure and functions in disease, the transition is easy and natural ; and as the investigation of the healthy appearance of the organs, and their component tissues, has prepared us for the discrimination of the various changes in them which constitute morbid Anatomy, so has the study of their healthy action prepared us for understanding those disturbances of that healthy action which are the object of pathology : though indeed the latter term is now generally understood to comprise the former, and, in fact, whatever relates to disease. But since, as we have already seen, the function of an organ is not a self-subsisting entity, something distinct from the organ, but that organ itself in action, so is the diseased function neither more nor less than the disordered organ in disordered action. Hence it is obvious, that the dependence of pathology on morbid Anatomy is precisely the same as that of physiology on healthy Anatomy ; and that as the latter must be studied in connexion, so must the former.

It must be admitted, it is true, that in many cases of disease we are still unable to detect the nature of

the lesions in which they have their origin, either because they are so fleeting, or so minute, however destructive in their effects, that they leave no traces after death, or because they are of such a nature as to perplex us with uncertainty whether they are causes or effects. By those indeed who would undervalue the labours of the morbid anatomist, the latter circumstance has been more particularly insisted upon as a source of obscurity in all cases, and of error in many. But if, in the morbid appearances that are presented to us after death, we cannot always discover the proximate cause of the disease, we may, nevertheless, recognise the immediate forerunner of death; the true nature of obscure and deceitful symptoms which, while they excite our suspicion, still elude our grasp, and disappoint our hopes of cure. We may sometimes, it is true, mistake the effect for the cause—we may err, for instance, in ascribing the essential cause of typhus, at one time to inflammation of the brain, at another to ulceration of the intestinal glands; but an error, which a more cautious philosophy or more extended observation must speedily dispel, is amply compensated by the discovery of important lesions which in their insidious progress had escaped the observation of the physician, until his attention had been directed to them by the previous disclosures of morbid Anatomy. Nor is it solely by inspection after death, but by

physiological inferences during life that we learn to connect the symptoms of disease with those inward changes of which they are but the outward manifestations. It is in a word this careful observation and comparison of symptoms with the deviations of structure, which we can infer by reasoning during life or detect by observation after death, which constitutes the foundation of pathology. When, however, I speak of deviations of structure as implied in every case of disease, I must be understood to use that expression in its widest acceptation, to denote by structure the fluids as well as the solids, and by deviation of structure any change in the condition of an organ, whether temporary, as in functional, or permanent, as in organic ; whether one of degree, as in common, or of kind, as in specific disease.

If such, however, be the nature of Pathology, it is manifest that a thorough knowledge of it can be acquired only at the bedside and on the dead body, and the student will possess ample opportunities for both in the clinical wards and dead-house of the hospital. But, whatever may be his preliminary knowledge, whatever his acuteness of observation, his attention must be distracted and his judgment perplexed by the multiplicity of phenomena, both of life and death, which long experience alone can enable him so to discriminate as to assign to each its proper weight and value ; to seize at a glance the symp-

oms or combinations of symptoms which should arrest his attention, and to dismiss, instinctively as it were, those that are unworthy of it. He is in some respects in the condition of the chemist, who, in devising a series of experiments for some specific end, might have to work his way to success through a series of failures, and to spend days or months in accomplishing a result which might have been communicated to him in as many minutes, by any person who had gone over the same ground before him. Now, what the previous discoverer is to the chemist in this case, the lecturer on Pathology is to the pupil in every case. He lays before him the results, not of his own experience merely, but of bygone generations, and teaches the pupil to apply the knowledge and powers of observation he has already acquired by the more compendious methods which that experience has supplied. But here the student must not rest satisfied. In Pathology, as in Physiology, he must not, as I have already remarked, be contented with receiving his knowledge at second-hand. He must return from the lecture-room to the bed-side and the dead-house; he must work out the problem for himself, but with this advantage from the lectures, that he is furnished with the most ready method for its solution. It appears, then, that although in the last instance a thorough and practical knowledge can be acquired only by

personal observation, yet the student may save himself the labour of many fruitless attempts, and prevent the loss of much valuable time, by making himself acquainted in the lecture-room with the experience of those who have gone over the same ground before him. Nor is this the only advantage to be derived from lectures. The cases of disease which the student has an opportunity of witnessing in the hospital are brought together indiscriminately, not as, for instance, the plants in a botanical garden, by their natural affinities, or their relations to a system, but by the ordinary casualties of life, whereas the lecturer on Pathology will exhibit in one view the several cases of disease, as they are connected by the important analogies of their seats and causes, and thus afford to the pupil the advantages of comparison and generalisation.

Since the study of Pathology is thus immediately connected with that of Anatomy and Physiology, it must through these be equally dependent upon the subsidiary sciences, Chemistry, Botany, Comparative Anatomy, and Natural Philosophy, which we have seen to be essential to a perfect knowledge of healthy structure and function. Nor is its dependence on these sources merely indirect. It is obvious, for instance, that Chemistry is essential to the pathologist, not only indirectly, by making him acquainted with the healthy composition of the struc-

ture he is investigating, and by thus furnishing him with the standard of comparison, but likewise by revealing to him the exact differences in composition of the same structure when it has become the subject of disease. Nor can it be denied that light has been thrown on the nature of diseases, by comparing them as they exist in man with the modifications they may assume in other animals. But the connection of Pathology with Anatomy and its subsidiary sciences is not one of dependence merely, but of reciprocity, since it reflects all the light it receives. Not only does our knowledge of healthy structure and function explain and illustrate the nature of disease, but conversely our knowledge of the organs in disease gives us a deeper insight into the functions in health. The disease, in fact, accomplishes for us spontaneously what the physiologist would attempt by experiment. It is the object of the physiologist, as of the philosopher generally, to ascertain, in the complexity of conditions that accompany any given effect, that condition on which the effect in question is immediately dependent, and this he endeavours to accomplish by separating them successively, one by one, until at last he arrives at the element he is in search of. Now the result which the physiologist endeavours to obtain by the difficult and often fallacious method of experiment, is not unfrequently presented to him by the analysing power of disease,

which, by a similar elimination, as it were, one by one, of the several elements of a complex instrument, enables him to trace each function, as it successively disappears, with the destruction or suspended action of its corresponding organ. If again we may include under the head of Pathology, as in one sense we certainly may, the subject of monstrosities, how much light has it not thrown on the more general laws of organisation which nature has perhaps nowhere rendered more conspicuous than in her very freaks and aberrations, verifying while it illustrates the apophthegm more often quoted than understood, that the exception proves the rule: and here again we come into contact with Comparative Anatomy, since the conformity of these aberrations to those more general laws to which they are but seeming exceptions can be established only by numerous and diversified examples, which a limited field of observation could not supply. Nor are such examples afforded only by the animal kingdom; on the contrary, they are nowhere more numerous or conspicuous than in the vegetable creation, where they are in some measure even under our control, since we can in many cases produce them at will. This, it is true, is a subject which more than any other that I have touched upon would require proof and illustration, much more, in fact, than it would be possible to devote to it on this occasion. Nor

indeed should I have alluded to it at all, were I not anxious above all things to convince you of the close, the vital, connection which exists between the several sciences that are to be the subjects of your future studies.

Such, then, gentlemen, are the sources from which you are to derive your knowledge of the conditions of the human body in health and disease. This knowledge, however, is but the means to the end you have in view, the preservation of health, the prevention and cure of disease. But since we can control events only by a knowledge of their causes, the preservation of health, or, what is the same thing, the prevention of disease, necessarily requires a knowledge of its causes, or if it be necessary to disguise so intelligible an expression in the garb of medical nomenclature, it requires a knowledge of etiology, the science which has for its object the investigation of the causes of disease, and which may be considered as a branch of Pathology, in the wider signification of this word. But where are we to search for the causes of disease? Manifestly either in the organic structure itself, or in the influence of external ^{agents} ~~organs~~. It has been well observed by the poet, that we are born dying. We bring with us into life the seeds of decay, which, whatever may be the influence of external agents, must sooner or later terminate in corruption. But over such causes

of disease, if indeed that gradual decay which is the necessary result, and in accordance with the final purpose, of the organisation, can be called disease, we have no control. We can at the utmost so temper the action of external agents on the human frame that they shall not accelerate its onward progress to decay ; we may remove, indeed, any extraneous body that might derange the mechanism of life, but we can neither so regulate the spring, nor lengthen the chain, that it shall not run down at its appointed time. But besides this necessary result of the mechanism of man, which in the very condition that called it into existence contains the necessary limits of its duration, and which must, sooner or later, cease to exist, not because it is imperfect, but because it is not infinite, there is reason to fear that in many there is some imperfection in the mechanism itself, some weak part which may give way before its time ; with the seeds of decay common to all there may be scattered seeds of disease ; which may either necessarily develop themselves in the gradual progress of evolution, whatever may be the influence of external circumstances which can at most accelerate or retard their growth, or may await in insidious slumber some untoward influence from without. Both conditions, however, may be considered rather as diseases themselves than as the causes of disease. They necessarily im-

ply some defect in structure, some deviation from its healthy condition; which, if we cannot detect, we may sometimes infer from a peculiar habit of body, or sometimes conjecture from the known operation of previous causes, which render probable the hereditary transmission of such disease ; while on the other hand, they may altogether elude our observation until they have assumed that aggravated form which places them beyond our control. Inasmuch, however, as they either require the operation of external agents for their production, or may be accelerated or retarded by them, they may be considered in the light of concurrent causes, and have indeed been classed among those which are said to predispose to disease. The range, however, of such causes is but limited when compared with that of external agents, which are by far the more prolific parents of disease. But we have already seen how vast is this same study of the influences of external agents. Here, indeed, the physician must be content to receive at second-hand much of the knowledge he is in quest of, but while he levies his contributions on every labourer in the field of science, he may, in the more circumscribed portion of that field which he himself undertakes to cultivate, still continue to receive the same valuable assistance from those subsidiary sciences which we have already seen to render such signal services in

Anatomy, Physiology, and Pathology. Chemistry, for example, may extract from some compound substance the elements on which depends its efficacy for good or evil; it may assist our researches into the nature of the same agent, by presenting it to us in different degrees or in different states of combination, and if it have not yet achieved all that has been demanded at its hands, if the subtle poison of malaria or pestilence still elude its grasp, what may we not hope, however, from what it has already accomplished! How much light, again, has been shed on the relations of heat, light, air, dryness, humidity, and even the vicissitudes of the seasons, in sustaining health, or generating disease, by careful observation of the habitudes of other animals than man, or by experiments on those animals which a knowledge of their structure and functions has pointed out as the fittest subjects for such experiments! Or, how can we better illustrate the influence of light, heat, or moisture on organised bodies, than by the effects we can produce at will in plants, by simply insuring the presence or absence of these important agents, producing at one time the sickly pallor of disease, at another the vivid hues of health—here the acrid and deleterious poison—there the bland and nutritious esculent?

It is almost needless to remark that it is in the same class of external agents that we are to look chiefly for

the instruments of cure. But among these, some may be said to exert a necessary, others a contingent influence. The first are the necessary conditions and supporters of life, the vital excitors, light, air, heat, and doubtless electricity, and the various alimentary substances that minister to our sustenance. The second class comprehends all the other agents of nature, and among them those which experience has shown, or may hereafter show, to produce effects of which we can frequently avail ourselves for the removal of disease. These have not, it is true, a stronger claim to be considered as remedial agents than the former, on which life is more immediately dependent, and the regulation of which is not less essential in the treatment of disease : nevertheless, they have usurped exclusively the appellation of medicines, and form the subject of *Materia Medica*, while the former constitute that of dietetics. Both are comprised in the science of general Therapeutics, which, under what are called the methods of cure, unfolds the general principles of their application to the prevention and cure of disease. If, however, we investigate a little more narrowly the nature of medicines, we shall perceive that since they do not contribute, either as vital stimuli, or supporters to the phenomena of life, their action must be necessarily extraneous, and that they can interfere in the healthy operations of the body

only to disturb : hence it has been justly observed, that medicines are merely relative agents ; that they become remedial only when the actions they excite may be successfully opposed to others which are the effects of disease. It may not, therefore, be too much to affirm, that in the employment, at least of the more powerful, remedies, we remove one disease by the substitution of another. But between the disease which we endeavour to remove, and that which we substitute, there is this important difference, that while the one is directly under our control the other is not. We have it in our power to control the disease we substitute, because we are in possession of its cause, which we can apply or withdraw at pleasure ; but in order that we may know when to apply and when to withdraw it, we must understand its mode of operation, we must understand the way in which it modifies the action, not of the organs only, but of the minuter tissues which compose them ; we must understand in a word its relation to the minute structures and systems of structure which may be the seat of disordered action. But what again does all this imply ? Clearly a minute knowledge of structure and function, of Anatomy and Physiology, and consequently of the subsidiary sciences on which these are dependent, and thus we see that these fundamental sciences are essential to a thorough knowledge, not less of the means of

cure, than of the nature of disease, and that if it were possible to conceive that a knowledge of the latter were attainable without them, they would still be required as the indispensable foundation of *Materia Medica* and *Therapeutics*. And here again I may apply the same remark as in the case of the other branches of medical study, that the assistance rendered by the subsidiary sciences is not merely indirect. I shall not, however, again weary your attention by endeavouring to show how much light has been thrown on the operations of medicines by studying their effects on other animals, and even on plants; nor shall I urge the very obvious reflection that our knowledge of the remedial resources of nature may be expected to increase in proportion as we extend our researches into its respective kingdoms, animal, vegetable, and mineral. It were idle to insist on the importance to the student of a familiar acquaintance with those plants at least which yield efficient medicines and energetic poisons, and although it can scarcely be expected that he should make himself acquainted with all the known species of plants even in his own country, yet he may surely acquire such a knowledge of their general affinities of structure as shall enable him to recognise their probable properties, in those at least, and they are not few, on which nature has impressed them in conspicuous and legible characters. Or does the

student doubt whether natural philosophy can be rendered subservient to the art of cure : let him ask the surgeon or the accoucheur whether he should make himself acquainted with the principles of action and construction of their respective instruments, before he can hope either to use them with the best effect, to devise new instruments or modify the old at the suggestions of unforeseen emergency ; whether this does not imply a knowledge of the properties of the lever, the pully, the screw, the wedge ; of the principles of acoustics, optics, and hydrostatics ; whether, therefore, natural philosophy be, not merely useful, but necessary to any one who aspires to practise by principle rather than by routine ? If the relation of these sciences to Therapeutics is so obvious that it does not require to be dwelt upon, surely the same may be affirmed of Chemistry, which here, indeed, under the name of Pharmacy, assumes its station among the principal medical sciences, and might be safely left to plead its own cause. But, nevertheless, I must pause a moment to signalise the essential services that it has more recently rendered to this department of medical science.

By presenting to us in a pure and concentrated state the proximate element on which the efficacy of a medicinal substance is immediately dependent, it enables us to apportion the dose of that medicine with a degree of precision hitherto unknown.

It resolves the more complex powers of remedies into their simpler properties, by showing the dependence of each on its peculiar principle, which we are thus enabled to administer separate or combined, as occasion may require.

It may scrutinize the pretensions of any new remedy, by the chemical examination of the element in which its efficacy may be supposed to reside, since, in many instances, what is chemically indifferent is vitally inert.

Lastly, by the same means of analysis, and especially when guided by a knowledge of the natural affinities of plants, as exhibited in their structure, it enables us to discover remedies hitherto unknown, to point out the identity of others supposed to be different, and sometimes to provide substitutes for costly and distant remedies among those more immediately within our reach.

When we have thus acquired a knowledge of the structure and functions of the human body, of the deviations from both which constitute disease, of the causes of such deviations, and of the means of correcting them, we approach at last the grand object of our studies, the discrimination of individual forms of disease, and the special application to these of the more general methods of cure, in other words, special Pathology and special Therapeutics, which in our own language are comprehended under the some-

what homely, but expressive, denomination, the practice of physic. The distinction however between general and special Pathology, and general and special therapeutics, may not perhaps be quite obvious, and will therefore require to be more clearly defined. We have already seen that Pathology, in its widest acceptation, comprises all that relates to what may be called the history of disease, and includes, therefore, its causes, symptoms, and mode of generation, or in medical nomenclature, etiology, symptomatology and pathogeny. In this sense, special pathology treats of the causes, symptoms, and mode of production of each individual disease, or, to speak perhaps more correctly, of each species of disease, whereas it is the object of general Pathology, not only by a more extensive survey of the multiplicity of particular facts, to resolve them into others more simple and comprehensive, but by the aid of Physiology, and all the collateral knowledge which Physiology implies, to derive from them the general principles or laws by which alone we can hope to interpret the individual phenomena of disease. Let us take an example from that department of Pathology which treats of the symptoms. Let us suppose, for instance, that the clinical student wishes to explore the exact nature of some disease which he suspects to have its seat in the chest: he perceives that his patient breathes with difficulty;

on applying his ear to the chest, he discovers that the peculiar murmur which is characteristic of respiration, cannot be heard; on striking the walls of the chest at the same part, he finds that it is sonorous. Here, then, he ascertains the existence of three symptoms; difficulty of breathing, absence of what is called the respiratory murmur, and resonance on percussion. But what do these symptoms convey to the mind of the uninformed observer? Nothing beyond the mere fact of their existence; as yet they are but symptoms, phenomena of disease, and nothing more; they denote nothing, they signify nothing, until by the aid of Physiology, and what in this case Physiology implies, the principles of acoustics, the student has learned to trace them to their cause, *i. e.*, an accumulation of air between the lungs and the inner surface of the chest. He then collects these few symptoms into a small but well-defined group; and to this group of symptoms, thus necessarily connected by their relations to a common cause, he assigns, under the name of *Pneumothorax*, its place in special Pathology. It is thus the object of general Pathology to interpret the phenomena of disease, by tracing them to the conditions on which they are dependent, and of which they are the signs, and hence it is that symptomatology here assumes the appellation of *Semeiotics*, or the doctrine of signs.

This example will, I trust, suffice to illustrate the relation of the general to the special sciences, as well in Therapeutics as in Pathology. In both cases it is the object of the general science to derive, not only from extended observation and comparison of particular facts, but also from the data furnished by Physiology and the collateral sciences, the fundamental principles or laws by which we can interpret individual phenomena; whether they relate to the operation of medicines, or the causes, symptoms, and generation of disease. They constitute, in fact, what is called the Theory of Medicine, the relation of which to practice you will now, I trust, understand; nor will you suffer yourselves to be misled by the strange misconception which some appear to entertain of the nature of medical theory, as if it were opposed to experience; since a little reflection will suffice to convince you that it is theory alone that can render experience possible. As this assertion, however, may appear at first sight somewhat startling, and as it is clearly of importance that we should entertain correct and definite notions on this subject, let us pause for a few moments to consider what it is that constitutes experience in medicine. What, then, is necessarily implied in every case of experience? On what do I ground my expectation that what I have known to occur in other cases will take place in the one before me? Clearly on the

uniformity of the laws of nature, on the belief that the same causes will produce the same effects, and conversely, that from identity of effects I may infer identity of cause. When, therefore, I apply to the cure of one disease a remedy that I have known to be successful in the cure of another, I do so in the belief that the two diseases are the same; and my confidence in the power of the medicine is precisely in proportion to my conviction of the identity of the two diseases: but how do I know their identity otherwise than by ascertaining their dependence on the same cause, since it is well known that diseases may resemble one another very closely in their symptoms, and yet differ widely in their real nature. Difficulty of breathing, for instance, may depend on disease of the heart; water in the chest; an effusion of air in the spongy substance, or in the air cells, of the lungs; or between the lungs and parietes of the chest, as in *Pneum^othorax*; and in all these it may be accompanied by many symptoms so similar, that it is not very long since they were frequently mistaken one for the other, and confounded together under the common name of *Asthma*. But what should we now say of the experience of him who could confound *emphysema* of the lungs with water in the chest? It may be objected, indeed, that we should in this case distinguish the real disease not by the symptoms that it has in common with the others, but by those

that are peculiar to it. But in ascertaining these symptoms, in the methodical interrogation of the patient, what is implied? Manifestly, a knowledge of the relation of those symptoms which are the objects of our inquiry to any cause which we may assume in the course of our investigation as the most probable. Or how does it happen that these diseases were not always distinguished by their peculiar symptoms? Because the physician was still unacquainted with the principles by which he could interpret them, or in other words, refer them to the internal conditions which they outwardly denoted. It is obvious, therefore, that we recognise a disease, and consequently its identity with others, by tracing it to its cause; and since experience implies identity of the cases on which it is founded, it is equally manifest that we acquire experience only by tracing effects to their causes. But we have seen that the principles by which we are enabled to do this are embodied in general Pathology and Therapeutics, a knowledge of which is therefore an essential condition for the acquisition of experience. Perhaps, however, the argument may be stated more briefly thus:—it will surely not be denied by the most strenuous advocates of experience, in its fancied opposition to theory, that it must signify, if anything, something more than seeing, or even than observing disease; it must surely require, not only that we ob-

serve, but that we reason on what we observe. Now, to reason is to infer a particular conclusion from a more general proposition, or, in science, to deduce a particular fact from a general principle or law ; experience, therefore, implies a knowledge of principles or laws, and these, as I have so often stated, are the objects of those sciences which constitute medical theory.

To those who are accustomed to use this word in the loose sense which it usually bears, or who do not reflect that a word may imply more than is directly expressed, or even distinctly conceived by many, who may nevertheless use it correctly, it may perhaps appear that the meaning I have assigned to it is not borne out by usage. I shall, however, look upon the meaning you may attach to the mere word as a matter of indifference, provided it do not, as words too often do, mislead you into error ; provided you understand clearly the necessary connexion of theory and practice, and do not suffer yourselves to be deceived by the vain illusion that any neglect of the study of medical theory will ever be compensated to you by what may be falsely called medical experience.

While I thus endeavour to convey to you a clear conception of the nature of general pathology and Therapeutics, as distinguished from special, and to vindicate their claims to your study as the very

ground-work of practical experience, I would not lead you to suppose that they have as yet fully realised the idea we have formed of them. The cases in which they enable us to establish a complete identity are comparatively few ; more frequently we are guided by a partial resemblance or analogy, and sometimes, though I trust but rarely, we are left to grope our way without the aid of either : and nothing perhaps can place in a clearer light the insufficiency of what is falsely called experience, than the circumstance that it is for these very cases which are the least understood, and, therefore, the most intractable, that it has furnished us with the greatest number of reputed remedies. We have, therefore, to regret the still imperfect state of these sciences ; nor can this excite our surprise, when we call to mind, what it has been a principal object of this Address to inculcate, that such is the necessary and reciprocal dependence of the medical sciences, that perfection in one would almost appear to imply perfection in all. It is something, however, to have formed, as I trust we have done, a clear conception of the nature of our problem, and if, by its vastness and complexity, it appear to mock the finite faculties of man, we may derive some encouragement from the progress that has been made within a comparatively recent period, as well as from the reflection that there is not, perhaps, a single successful

labourer in the field of science who may not, however unconsciously, be contributing something towards its final solution. We are, even now, however, in possession of many valuable fragments; yet it may be doubted whether they are not too disjointed to admit of being constructed into a complete and scientific system. It is perhaps for this reason that in this school, as well, I believe, as in every other in the metropolis, no separate course of lectures is given on the subject; but it is generally reserved for the lecturer on the practice of Physic, either to introduce it prominently in a series of lectures at the commencement of his course, or interweaving it imperceptibly with it, to take it up as occasion may suggest. Be that, however, as it may, some general views are necessarily implied in whatever classification he may happen to adopt, it being manifest that in this, as in every subject that is perplexed with a multiplicity of details, a methodical arrangement, even though it be an arbitrary one, must be indispensable, not less for the communication than for the acquisition of knowledge. But the classification of disease has, under the name of Nosology, been a fruitful source of controversy, and the disputes about artificial and natural arrangements are as rife in Medicine as in any other department of science. The appreciation, however, of the respective merits of either system in relation to the present state of

our knowledge does not fall within the scope of an Introductory Address, and may be more fitly reserved for the lecturer on special Pathology.

With regard to the method of studying special Pathology and Therapeutics, I have already anticipated all that I can say on the subject, in my remarks on the study of disease in general. The knowledge of the principles of treatment is of course like that of general disease, to be acquired in the lecture room and in the wards of the hospital, and the relation of lectures to practical study at the bedside is in both cases the same.

You may, perhaps, imagine that I should now proceed to the separate consideration of Surgery and the practice of Midwifery, but I conceive that I have already considered them under the head of Therapeutics, of which they form essential and integral parts. Although, indeed, it may be thought advisable, on the mere principles of division of labour, to separate the practice of Medicine as an art, into the three departments of Physic, Surgery, and Midwifery, yet in science they are essentially one, and to distinguish between them would be to lacerate and not to divide. No one, indeed, need imagine that he can become deservedly eminent either in Physic, Surgery, or Midwifery, without laying the same foundation broad and deep in the study of man and external nature.

There is one other subject not included in any of the foregoing sciences, but rather comprehending them all, and bearing, nevertheless, no immediate relation to the main object of your studies: I mean the application of Medical knowledge to the elucidation of doubtful questions that may arise in a ~~courte~~ court of law, or in other words, forensic Medicine. On the exact relation, however, of this subject to your duties as medical men, as well as the motives of humanity or prudence, which recommend it to your serious attention, I do not think it needful to insist at present, nor can I do more than allude to its kindred subject, Medical Police, or the science which teaches the application of our knowledge of the conditions of health and disease to the Physical well-being of the community.

I have thus, Gentlemen, endeavoured to give you a bird's-eye view of the several subjects comprised in the field of your future labours, to point out to you the way in which they are to be cultivated, and to demonstrate the close and vital connection that subsists between them: to show that this connection is not merely that of a progressive series, but one of reciprocal dependence, and may be most fitly represented, not by a strait chain, but by a circular arrangement, in which each link may be considered either as the beginning or the end. If I have succeeded, then, in conveying to you a tolerably distinct conception of

the several medical sciences, and above all, if I have so impressed you with the importance of all to each, that you shall be convinced that not one of them can be safely neglected, I shall have accomplished all that I could hope to perform. I could have wished, indeed, had my time permitted, to rectify some misapprehensions that might arise from the general nature of the statements I have made, and I would gladly have enlivened, as well as elucidated my subject by more ample illustration; but the expiring hour has already warned me that I must bring this Address to an abrupt termination; and I shall, therefore, conclude by offering, in the name of my colleagues and myself, our sincere congratulations to those gentlemen who are about to enter on the most interesting of all studies—the study of man; and by expressing our best wishes, and, indeed, our confident hope, that they may hereafter apply in practice the knowledge they have acquired, both to their own honour and advantage, and to the benefit of their fellow-creatures.

THE END.

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